

Preventing Infant Deaths through Safe Sleep Education

A Senior Honors Project Presented to the Faculty of the
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Abstract

Sudden unexpected infant death (SUID) is the death of an infant less than 1 year of age and can be reported as sudden infant death syndrome (SIDS), unknown cause, or accidental strangulation and suffocation. These reports are determined upon completion of a thorough investigation. SIDS is the leading cause of death in infants in the United States. Healthy Mothers Healthy Babies (HMHB) Coalition of Hawai'i is a local nonprofit that provides mothers with proper education and prenatal programs. This project focuses primarily on the Hawaii Cribs for Kids Program facilitated by HMHB. The purpose of this study was to identify the demographics of mothers who attend the Cribs for Kids classes in Hawaii and identify common misconceptions about safe sleep practices. By having this information readily available, HMHB can improve class material to be more culturally appropriate and to teach recommendations and prioritize mothers at high risk when doing outreach. Results indicated that mothers learned most about pacifier use for safe sleep and how bumper pads and wedges or positioners can be hazardous when placed in an infant's sleep environment.

Keywords: Sudden unexpected infant death, sudden infant death syndrome, Hawaii, Cribs for Kids Program

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CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW

Healthy Mothers Healthy Babies Coalition of Hawaii

Healthy Mothers Healthy Babies (HMHB) coalition began in the United States in 1981, prompted by the US Surgeon General's conference on infant mortality. Based on this conference, The American College of Obstetricians and Gynecologists (ACOG), the March of Dimes, the American Academy of Pediatrics (AAP), the American Nurses Associations (ANA), the National Congress of Parents and Teachers and the US Public Health Service worked together to establish the informal coalition to improve the quality and reach of public and professional education related to prenatal and infant care. Since then, HMHB is a recognized leader and resource in maternal and child health. HMHB reaches approximately 10 million health care professionals, parents, and policymakers through its membership of over 100 local, state, and national organizations.

Through the partnerships made among community groups, nonprofits, professional associations, businesses and government agencies, HMHB's mission is to improve the health and safety of mothers, babies, and families through educational materials and collaborative partnerships. HMHB believes that children hold the right to be born healthy and raised in a safe and nurturing environment and families should have equal access to quality health care. Additionally, they believe in a collective voice to facilitate change and eliminate health disparities among all populations. To do so, there should be cultural competence and respect for diversity as well as education to encourage healthy choices (National Healthy Mothers, Healthy Babies Coalition, 2012).

Healthy Mothers Health Babies Coalition of Hawai'i (HMHB Hawai'i) was established in 1992 and is a local nonprofit agency that is a part of a national network of

organizations and individuals committed to improving Hawai‘i’s maternal, child, and family health through collaborative efforts in public education, advocacy, and partner development. Programs and workshops are offered to ensure women and families receive access to resources and information before, during, and after pregnancy.

The following programs are offered by HMHB Hawai‘i. The MothersCare Phone Line offers personal responses to questions about what to expect during pregnancy or how to find information to promote a healthy pregnancy. “Becoming a Mother” is a workshop series for parents and soon-to-be mothers to learn practices that will help mothers discover their inner guidance, develop social support, and trust that mothers and their babies will thrive. Text4Baby is a free text messaging service to provide information about each stage of pregnancy. Hawai‘i Cribs for Kids is a safe sleep education program for low-income, high-risk pregnant women to reduce the incidence of sudden unexpected infant deaths (SUIDs). Upon completion of the class, participants are given a free crib to provide their infant with a safe place to sleep (Healthy Mothers Healthy Babies Coalition of Hawaii, 2).

Sudden Unexpected Infant Death (SUID)

In the United States, there were 3,700 sudden unexpected infant deaths in 2015. Sudden unexpected infant death (SUID) is the death of an infant less than 1 year of age whose cause of death is not immediately obvious before an investigation is conducted. SUIDs can be reported as one of three types.

One type of SUID is sudden infant death syndrome (SIDS). This is the death of an infant less than 1 year of age that cannot be explained after an investigation is completed

consisting of a complete autopsy, examination of the death scene, and a review of the clinical history. SIDS is the leading cause of death among infants 1 to 12 months old.

SUID can also be classified as an unknown cause. This is the case when the infant death remains undetermined because the investigation has not been completed yet.

Lastly, SUID can be reported as accidental suffocation and strangulation in bed. Death can be due to suffocation by soft bedding since soft bedding or pillows have the ability to cover an infant's nose and mouth leading to suffocation since an infant does not have the reflexes to push these materials away from their faces. Additionally, overlay may be reported when another person may roll on top of the infant while sleeping if the infant is sleeping in an adult bed. Wedging or entrapment can occur when an infant may become wedged between two objects such as a mattress and wall, bed frame, furniture, or even wedges marketed to mothers to supposedly promote safe sleep. Strangulation can occur when an infant's head and neck become caught between crib railings or if there are loose curtain lines hanging around an infant's crib ("Sudden Unexpected Infant Death and Sudden Infant Death Syndrome," 2017).

Reducing the Risk of SUIDs

Although there is no exact cause linked to SIDS, research shows that if parents and caregivers take action and follow recommendations, the risk of SUIDs can be reduced. Parents should always put their babies on their backs for naps and regular sleep at night. Firm sleeping surfaces, such as a mattress covered by a fitted sheet, room sharing without bed sharing, and removal of soft objects, such as pillows and loose bedding, from the baby's sleep area all greatly reduce the risk of suffocation. Mothers should not smoke during pregnancy or around the baby because these are strong risk

factors for SIDS. Risk is even greater when a baby shares a bed with a smoker (“Sudden Infant Death Syndrome (SIDS),” 2016).

Infant Mortality in Hawai‘i

In 2013, researchers investigated infant mortality specifically in Hawai‘i. Infant mortality included preterm births, congenital malformations, maternal complications and SIDS. After collecting data around the state, they created a map that showed the rates of infant mortality based on city. On their map of Oahu, their data showed that Wai‘anae had the highest rate of infant mortality of 8.3-12.4 deaths per 1,000 live births. The next highest rates were seen in ‘Ewa – Kalaeloa and Downtown-Kalihi with rates of 7.0-8.2 deaths per 1,000 live births. Rates were also reported higher in cities on Molokai, Big Island, and Kauai. The rates of other cities on Oahu and the other islands of Hawai‘i can be seen below.

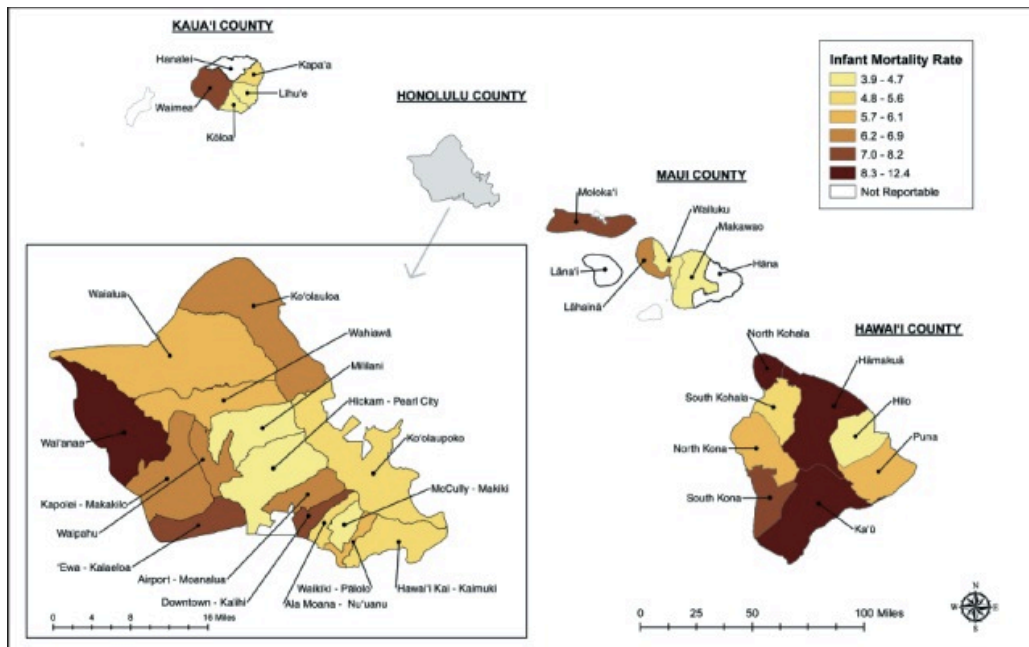


Figure 1.1 Infant Mortality Rate (per 1,000 live births) by Primary Care Service Area, 2001-2010 (Hayes et. al 2013).

Although this is a map of infant mortality rates and not specifically SIDS, this data shows that the infants in these areas are at most risk of death and by targeting aspects that leads to mortality, hopefully the rate of mortality will decrease (Hayes et. al 2013).

Infant Mortality Rates for Hawaiian Women

Although the United States has made significant progress over the past century in reducing infant mortality rates, there is continued existence of an inverse association between infant mortality and various indicators of socioeconomic status. This research emphasizes the need for continuous monitoring of this relationship in order for agencies to serve the populations in communities in need (Stockwell, Goza, Balistreri, 2005).

Hawaiians experience infant mortality at higher rates than other ethnic groups in Hawaii and in the continental U.S. This poor health outcome is alarming due to the fact that Hawaiians have near universal availability of health services under the Prepaid Health Care Act that requires employers to provide coverage in a pre-paid health care plan that includes maternity benefits to employees. Regardless of this privilege and right, Hawaiians continue to under-utilize services resulting in low prenatal care visits, low birth weight, and high infant mortality rates in comparison to other ethnic groups in Hawaii.

Hawaiian women were found to have the most pregnancies and live births when compared to other ethnic groups, yet they had the lowest percentage of first trimester prenatal care (77.8%). Furthermore, Hawaiian women are more likely to not receive care after the first trimester when compared to white, Chinese, Filipino, and Japanese women. When researchers analyzed the association between maternal characteristics and prenatal care, they found that inadequate prenatal care use or no prenatal care included women

who were: Hawaiian, unmarried, under 18 years old, and had high parity for age and low educational attainment. In regards to low birth rate, Hawaiians had the highest absolute number of low birth weight rates surprisingly not due to low socioeconomic status or inadequate prenatal care. Low birth rate infants were more so correlated with single mothers.

For Hawaiian women, health outcomes for women and children are due to risk factors beyond socioeconomic status and access to care. Important findings from research suggest the following: Hawaiian women who are unmarried and/or high parity for age use less prenatal care, Hawaiian women do not have a higher rate of low birth weights despite lower socioeconomic status, and Hawaiian infants have an excessive postneonatal mortality rate. These findings can significantly impact program development for this high-risk population (Todd and Peabody, 2004).

Pacifier Use to Prevent SIDS

Recently, studies have found that pacifier use during sleep has been found to decrease risk for SIDS. Pacifier use even decreased the risk of SIDS more when the infant was sleeping in the prone/side position, bed sharing, and when soft bedding was present. These findings provide evidence that pacifier use may be an additional strategy to reduce the risk of SIDS for infants at high risk or adverse sleep environments (Moon et. al, 2011).

Studies have also shown that campaigns for risk reduction have helped reduce SIDS incidence by 50-90%. These campaigns consisted of encouraging families to place infants on their back for sleep rather than on their side or prone (on their stomach). Additionally, campaigns stressed the danger associated with soft bedding and soft

surfaces, including pillows, quilts, comforters, sheepskins, and porous mattresses as well as warmer room temperatures and multiple layers of clothing or blankets. Bed sharing was also stressed as dangerous and especially hazardous when mothers were smokers. To further reduce the incidence rate, greater strides must be made in reducing prenatal smoke exposure and implementing other recommended infant care practices (Moon, Horne, Hauck, 2007).

Wedge/Positioners Advertised to Promote Safe Sleep

Wedge or positioners can be found all over the market as a flat mat with side bolsters or an inclined wedge mat with side bolsters. All are advertised as a preventative measure that should be bought in order to keep babies safe while they sleep, and claim to reduce the risk of sudden infant death syndrome (SIDS). Recent findings suggest that these products may have the exact opposite effect. From 1997 to 2012, at least 13 infants have died while lying in these sleep positioners or sleep wedges according to the CDC. 12 out of the 13 deaths involved infants aged 3 months or less. Majority of the infants were placed on their sides to sleep in the sleep positioner and were later found lying on their stomachs eventually leading to death by suffocation (Warner, 2012).

The U.S. Food and Drug Administration (FDA) has never approved any infant sleep positioner to prevent or reduce the risk of SIDS. The U.S. Consumer Product Safety Commission (CPSC) joined together with the FDA and issued a warning against the use of sleep positioners in 2010 (Warner, 2012). Yet companies manufacturing these products continue to sell them and claim that they will benefit mothers. From a mother's perspective, this can be extremely misleading and confusing. Without proper education

regarding these products, mothers can have the right intentions and purchase these products, but might potentially harm their child in the end.

Promoting Early Prenatal Care

A study done by the Centre of Excellence for Children and Adolescents with Special Needs in St. Johns, Canada, by researchers Canning, Frizzell, and Courage (2010) found that mothers with low income were more likely to have low birth weight children as well as not participate in prenatal support programs compared to women with higher income. In this study, women participated in the Newfoundland and Labrador Mother-Baby Nutrition Supplement (MBNS) that provided monthly financial supplement and printed information on infant health and development, as well as referral to public health nursing services. Results showed that women who enrolled early were less likely to have a low birth weight child. The study went further to state that regardless of increased risk due to low income, age and education, and single status, the MBNS was an effective intervention for improving birth outcomes. In the end, the researchers stated that the challenge was enrolling pregnant women as early as possible to yield the most effective outcome (Canning et al. 2010).

These findings provide significance as to why it is important to, not only support HMHB, but to also ensure that mothers get enrolled in the programs that are offered early enough for them to be beneficial. By reaching mothers earlier to promote early enrollment, they will be fully prepared and have the resources that they need to raise their child.

CHAPTER TWO: SIGNIFICANCE

In the United States, approximately 3,500 infants die annually from sleep related deaths, including SIDS and accidental suffocation and strangulation in bed (Moon, 2016). According to statistics taken from the Hawai'i State Department of Health, as of 2016, there have been 5.6 infant deaths per 1,000 live births ("Infant Mortality Rate," 2016). Based on this data, the prevention of infant mortality due to unsafe sleep practices should be a prioritized public health issue both nationally and in Hawai'i.

Parents that are able to effectively create a safe sleep environment for their child can greatly reduce the risk of all sleep-related infant deaths. The American Academy of Pediatrics (AAP) recommends supine positioning, the use of a firm sleep surface, room sharing without bed-sharing, and the avoidance of soft bedding or overheating. Additionally, in relation to SIDS reduction, the AAP recommends avoiding exposure to smoke, alcohol, and illicit drugs, increased breastfeeding, routine immunization, and use of a pacifier. If all of these practices are effectively communicated to pregnant mothers and properly implemented, the risk of sleep-related infant deaths can potentially drastically decline (Moon, 2016).

Unfortunately, the data suggests that mothers are not listening to suggestions or still may potentially be unaware of them. According to the 2009-2011 Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS), 23.5% of babies are laid to sleep in high-risk sleep positions (on their side or stomach). 33.8% of babies "always" or "often" slept in the same bed with their mothers or someone else and an additional 20.5% of babies "sometimes" did. Their data collection and analysis concluded that only 35.4% of

babies usually slept in an environment that met all of the recommendations for a safe sleep environment (Elia, Roberson, Niitani 2013).

SIDS prevention is also highly related to access to proper prenatal care. Prenatal care consists of screening for pregnancy complications, managing chronic conditions, and gaining the education needed to succeed. Unfortunately, according to the PRAMS, the rate of prenatal care in the first trimester of pregnancy in Hawai'i has decreased from 82.1% in 2001 to 78.8% in 2008. Personal, structural, and financial factors have contributed to this decrease. Women said that problems they faced regarding accessing prenatal care ranged from being unable to schedule a timely appointment due to physician shortage to not having enough money to pay for services. Two thirds of women that received late care or no care reported that they intended to get care earlier, but they encountered at least one barrier that prevented them from doing so.

Maternal characteristics, in relation to getting prenatal care, were also analyzed. The following women were less likely to receive prenatal care: Other Pacific Islander, Samoan, Hispanic, Hawaiian, younger, less educated, unmarried, uninsured, those who had unintended pregnancies, those who were encountering intimate partner violence before pregnancy, and those who lived outside of Honolulu county (Schempf, Hayes, Fuddy, 2010).

Based on these findings, there needs to be greater outreach and effective community education promoting the value of early prenatal care. This project focused on improving the pre-existing Healthy Mothers Healthy Babies Coalition of Hawaii (HMHB) Hawaii Cribs for Kids Program that is currently available to low-income, high-risk pregnant women. This program includes an hour long comprehensive, culturally

appropriate, family-oriented safe sleep education class and provides mothers with a free Graco Pack N Play upon completion of the class. The purpose of this study was to identify the demographics of mothers who attend the Cribs for Kids classes in Hawaii. Having this information allows Healthy Mothers Healthy Babies to create culturally appropriate class materials and prioritize these mothers when doing outreach. This study also identified recommendations that mothers learned from the class and will hopefully apply to allow their child to sleep safely.

CHAPTER THREE: RESEARCH METHODOLOGY

This project was geared towards improving the efficiency and efficacy of the Hawai'i Cribs for Kids Program in order to reduce the rate of Sudden Infant Death Syndrome (SIDS) and other sleep-related deaths. The study population was low income, high-risk mothers on the islands of Hawai'i, Kauai, Maui, Moloka'i, and Oahu.

The Hawai'i Cribs for Kids Program is partnered with the following organizations to provide these classes. On Oahu, classes were located at Waimanalo Health Center, Waianae Coast Community Health Center, and Parents and Children Together in Kalihi. Previously, classes were also held at Child and Family Services, Catholic Charities Hawaii, Kapiolani Medical Women and Children's Hospital, Kokua Kalihi Valley, Waikiki Community Center, The Salvation Army, and Shriners. On Maui, classes were located and referrals are received from Maui Family Support Services, Hana Health, and Maui High School. On Molokai, classes are held at Molokai General Women's Hospital. On Lanai, classes were held at Maui Family Support Services – Lanai Branch. On the Big Island, classes were held at Bay Clinic and West Hawaii Community Health Clinic. On Kauai, classes were held at Hua Moon and Women Infant and Children (WIC) Lihue.

This program was entirely referral-based for qualified women by their social worker or case manager. Self-referrals were not accepted. This is where Healthy Mothers Healthy Babies (HMHB) played a significant role. HMHB helped connect these mothers to others that would be able to assist them in this area.

The hour long education classes consisted of the following topics: resources that HMHB offers such as the online directory, text4baby program, MothersCare Phone Line, sleep-related death United States statistics, and identifying risk factors in a picture of a

baby sleeping. Following these topics, methods to keep infants safe while sleeping were shared. The following suggestions were made based on American Academy of Pediatrics (AAP) recommendations: placing baby in their own crib, placing them on their back to sleep, room sharing without bed sharing, not using positioners/wedges, rails, car seats or swings for regular sleep, keeping prenatal appointments, no smoking, alcohol or drugs, breastfeeding, making sure baby is appropriately dressed, getting vaccinated/immunized, pacifier use, skin to skin contact benefits, the period of PURPLE crying or colic, and shaken baby syndrome. Upon completion of the PowerPoint presentation, mothers were quizzed on whether pictures demonstrated safe or unsafe practices.

During the education classes, pre and post quantitative surveys were distributed to mothers in order to gauge how much information they learned about safe sleep practices upon completion of the class. Twenty questions were asked with true/false as answer choices about the following topics: safe sleep position and location for baby, what is safe/unsafe in a crib, pacifier use, appropriate clothing for baby during sleep, tummy time, breast feeding, alcohol and illicit drug use, prenatal care, and immunizations. At the end of the class, mothers were asked to come to the front of the class and physically take out unsafe items from the crib such as blankets, pillows, stuffed animals, and beanies.

An exempt IRB application has been submitted through the University of Hawaii at Manoa and is under review.

Confirming attendance at Cribs for Kids classes was one of the barriers that was faced during this project. To communicate with mothers more effectively, text messaging

was utilized in order to invite them to classes and remind them that they signed up to attend.

Referral forms of mothers who attended Cribs for Kids class from April 2013 to February 2017 were analyzed to determine the demographic population that the current program serves. Data entry spreadsheets were updated and organized in order to efficiently input pre and post test results and analyze quickly and accurately. Pre and post tests received from August 2016 to March 2017 were analyzed to determine what information mothers were unaware of before the class and then learned after listening to the class.

With the help and collaboration of Lisa Kimura, Executive Director of HMHB Coalition of Hawai'i, programs that were already implemented will be adjusted to promote the health of mothers in Hawai'i.

Limitations

One limitation of this study was that all information on the referral application referring to initial and regular prenatal care visits, infant's sleep position and location, infant's feeding method, pacifier usage, maternal or family member smoking while pregnant and after pregnancy, maternal alcohol use, maternal and family member illicit drug use and infant's immunization was self reported by mothers.

CHAPTER FOUR: RESULTS AND DISCUSSION

Results

Demographics From Referral Forms

In this study, data was compiled from applicants that attended classes on Oahu, Maui, Molokai, Lanai, and Big Island from April 2013 to February 2017. Data was taken from a total of 421 mothers. 285 mothers attended classes on Oahu, 50 mothers attended classes on Maui, 15 mothers attended classes on Molokai, 8 mothers attended classes on Lanai, 45 mothers attended classes on the Big Island, and 18 mothers attended classes on Kauai.

Table 4.1. From April 2013 to February 2017, 421 cribs were distributed across the islands. The breakdown of cribs distributed on each island are as follows.

Attendance at Cribs for Kids Classes Throughout Hawaii from April 2013 to February 2017		
Island	Number of Mothers	Percentage of Mothers Served
Oahu	285	68%
Maui	50	12%
Molokai	15	4%
Lanai	8	2%
Big Island	45	11%
Kauai	18	4%
TOTAL	421	

Demographic data was taken from all applicants that attended Cribs for Kids classes from April 2013 to February 2017. The following factors were recorded and results are as follows. Data was taken on the following: marital status, education level, initial prenatal care visit, regular prenatal care, infant's current or planned sleep location, infant's current or planned sleep position, infant's current or planned feeding method, pacifier usage, maternal smoking during and after pregnancy, family/household smoking

during or after pregnancy, maternal alcohol use during pregnancy, maternal illicit drug use during pregnancy, family/household illicit drug use, and immunization decision. Age range was also recorded.

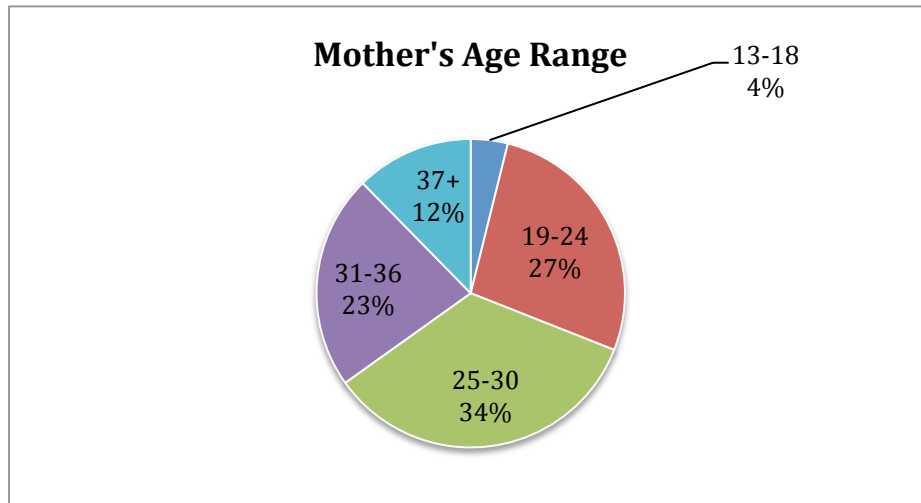


Figure 4.1 Age ranges of mothers who attended Cribs for Kids classes from April 2013 to February 2017.

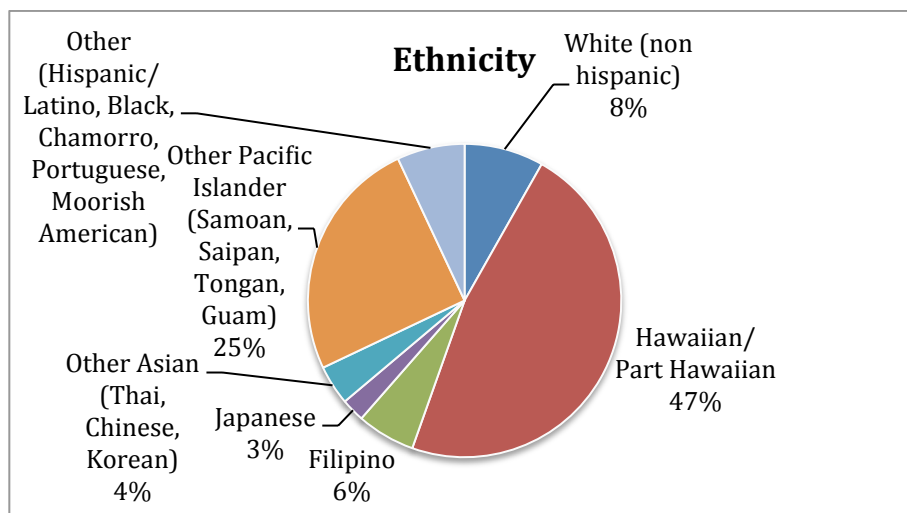


Figure 4.2 Ethnicity of mothers who attend Cribs for Kids classes throughout Hawaii.

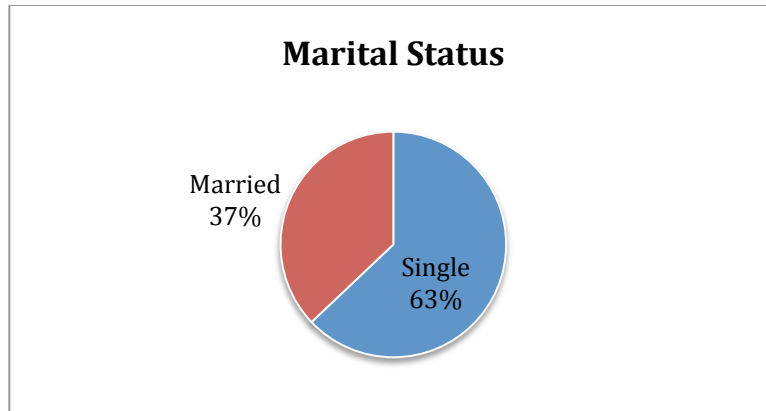


Figure 4.3 Marital status of mothers that attended Cribs for Kids classes from April 2013 to February 2017.

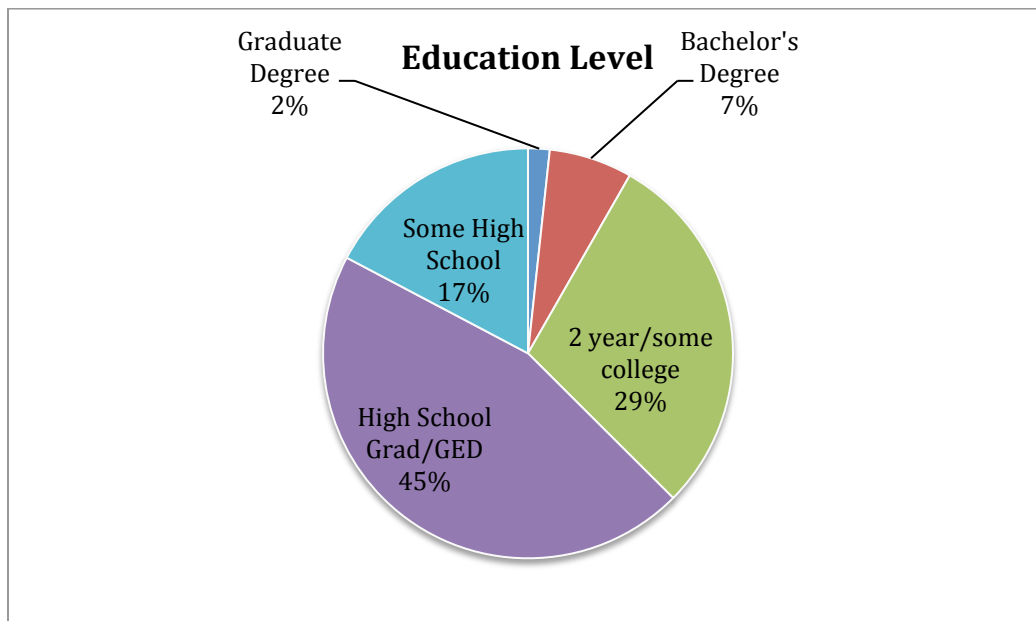


Figure 4.4 Education level of mothers who attended Cribs for Kids classes from April 2013 to February 2017.

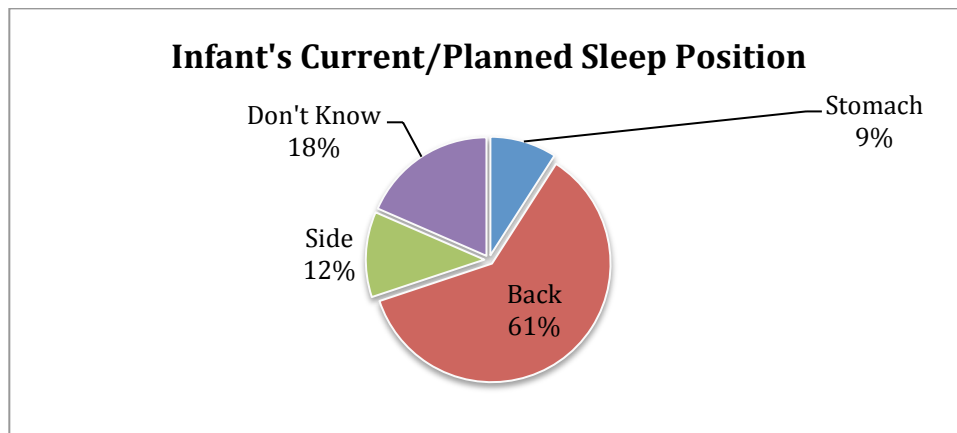


Figure 4.5 The current or planned sleep position that mothers reported on applications.

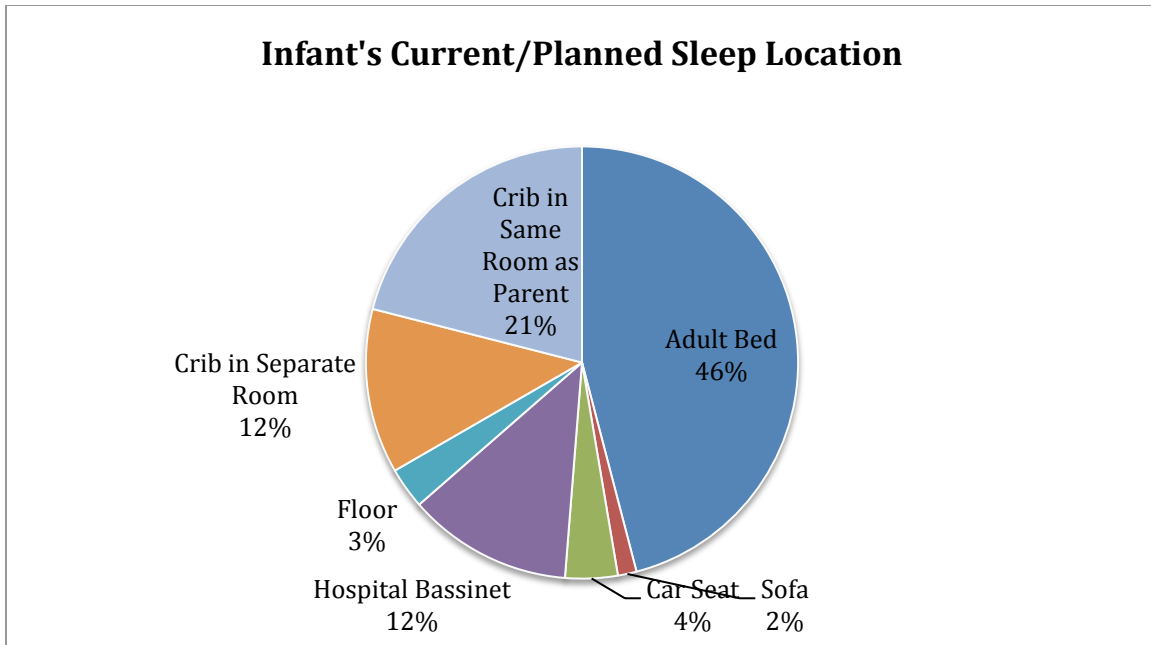


Figure 4.6 The current or planned sleep location that mothers reported on applications.

Pre and Post Test Evaluation

Data from pre and post tests of 195 mothers who attended the Cribs for Kids classes on Oahu, Maui, Molokai, Lanai, and Big Island from August 2016- March 2017 was analyzed. Pre and post tests contained questions regarding safe sleep that was taught during the hour long education portion of the Cribs for Kids class. These tests contained the same 20 questions to gauge what mothers learned after listening to the PowerPoint presentation. Three questions asked on these tests yielded significant results. The questions regarded pacifier usage, bumper pads, and wedge/positioner usage. Before the class was taught, the average scores for these questions were low, but increased as seen in post test results. Pre and post tests can be referenced in Appendix A.

Question 5 asked mothers to answer True or False to the following statement: I should give my baby a pacifier while he sleeps because it makes it easier for him to breathe. The correct answer to this statement was true, as discussed earlier in the

literature review. On the pre tests, only 17% of mothers responded with the correct answer. After learning about pacifier use during sleep to promote safe sleep, 71% of mothers responded with the correct answer on their post tests.

Question 10 asked mothers to answer True or False to the following statement: I should use bumper pads in my baby's crib so he doesn't get hurt. The correct answer to this statement was false. On the pre tests only 50% of mothers responded with the correct answer. On the post tests, 87% answered correctly.

Question 11 asked mothers to answer True or False to the following statement: I should use a wedge or a positioner to protect my baby from Sudden Infant Death Syndrome/Sudden Unexplained Infant Death (SIDS/SUID). The correct answer to this statement was false. On the pre tests 45% answered correctly and correct answers increased to 83% on post tests.

Discussion

Demographic Information of Mothers Who Attended Classes

Demographic data from Cribs for Kids participants from April 2013 to February 2017 was investigated. Data that was compiled showed that 421 mothers throughout Hawaii have already been provided with cribs through this program. This finding indicated one of the successes of the Cribs for Kids classes in Hawaii. Had it not been for this program, these children may not have had their own crib to sleep in and their risk for mortality would have been much higher.

The demographic data analyzed represents the mothers in Hawaii that needed the Cribs for Kids classes the most due to various factors in their lives. When looking at age, majority of the mothers (34%) were 25-30 and there were only 4% of mothers that were

13-18. Ethnicity was an important finding because data shows that 47% of the mothers that attended classes indicated that they were Hawaiian or part Hawaiian. 25% of the mothers that attended the Cribs for Kids classes identified as, “Other Pacific Islander,” that included Samoan, Saipan, Tongan, and Guam. This finding identified another population in Hawaii that is at high risk for infant mortality and greatly benefits from this class. Future efforts should be made to address disparities that this population faces.

When looking at marital status, 63% of the mothers that attended classes identified as single. This data also supports literature previously mentioned since infants born to single mothers are at higher risk for mortality.

When looking at education level, majority or 45% of the mothers indicated that the highest form of education that they achieved was high school. This data provides evidence that majority of this population may have faced barriers that prevented them from pursuing higher levels of education and this should be taken to account when creating content to teach them about various sleep recommendations.

Overall, demographic data provides evidence that the following populations are at highest risk for infant mortality and need to be addressed: Hawaiians/Part Hawaiians, Other Pacific Islanders (Samoan, Saipan, Tongan, Guam), mothers who are single, mothers with only a high school diploma.

Infant’s Current/Planned Sleep Position and Location

On referral applications, mothers were asked to identify how and where they were planning to put their child to sleep. For position, 61% of mothers indicated that they were going to put their child to sleep on their back, 12% indicated that they were going to put their child to sleep on their side, 9% indicated that they were going to put their child to

sleep on their stomach, and 18% indicated that they did not know what position they were going to put their child to sleep. This data represents the lack of knowledge for the 39% of mothers that indicated that they were going to put their children to sleep on their side, stomach, or that they didn't know.

For location, only 21% of mothers indicated that they were going to put their child to sleep in a crib in the same room as a parent which is the recommendation made by the American Academy of Pediatrics (AAP). 46% indicated that they were going to put their child to sleep in an adult bed, 2% indicated sofa, 4% indicated car seat, 12% indicated hospital bassinet, 3% indicated floor, and 12% indicated a crib in a separate room. All 79% of these responses are potential risk factors that may lead to infant mortality due to potential suffocation or strangulation of the infant. These locations were addressed in the PowerPoint presentation and mothers later were able to identify safe sleep locations. Locations may also have been identified due to lack of funds to purchase a crib to allow their child to sleep safely. Future research can be done on the specific barriers that prevent mothers from providing their child a safe sleep environment.

Pre and Post Test Results

Twenty of the same True/False questions were asked on the pre and post tests in order to test knowledge gained about safe sleep practices from the Cribs for Kids hour long education portion of the class. Overall, knowledge increased on all islands. On Oahu, from 2015 to 2017, scores increased 19% and 14%, respectively. From 2016-2017, on Maui County and Kauai, scores increased 24%, and on the Big Island, scores increased 25%. This finding indicates that mothers learned about some recommendations that they were unaware of before taking the class. Out of the twenty questions asked,

three of the questions yielded significant responses as the amount correct on the pre test differed greatly from the amount correct on the post tests indicating a topic that most mothers learned about through the Cribs for Kids class specifically.

Pacifier Use

Question 5 asked mothers to answer True or False to the following statement: I should give my baby a pacifier while he sleeps because it makes it easier for him to breathe. The correct answer to this statement was true, as discussed earlier in the literature review. On the pre tests, only 17% of mothers responded with the correct answer. After learning about pacifier use during sleep to promote safe sleep, 71% of mothers responded with the correct answer on their post tests. These findings indicate the lack of knowledge regarding this new recommendation made by the American Academy of Pediatrics (AAP). Mothers were informed of this new preventative measure at the class and could start implementing this practice when putting their baby to sleep.

Accessories for Cribs: Bumper Pads and Wedges/Positioners

Questions 10 and 11 were focused on asking the mothers if common crib accessories found on the market are safe or conducive to safe sleep for a baby. Question 10 asked mothers to answer True or False to the following statement: I should use bumper pads in my baby's crib so he doesn't get hurt. The correct answer to this statement was false. On the pre tests only 50% of mothers responded with the correct answer. On the post tests, 87% answered correctly. These findings indicate that there is a misconception regarding how cribs should be set up in order to create a safe environment for babies to sleep in. Mothers are constantly exposed to a variety of accessories that are advertised to promote safe sleep for their babies when in actuality, they are unnecessary

and unsafe. Based on the increase in post test scores, the class was effective at teaching the mothers that bumper pads are unsafe.

Question 11 asked mothers to answer True or False to the following statement: I should use a wedge or a positioner to protect my baby from Sudden Infant Death Syndrome/Sudden Unexplained Infant Death (SIDS/SUID). The correct answer to this statement was false. On the pre tests 45% answered correctly and correct answers increased to 83% on post tests. These findings further indicate that there are misconceptions about what is needed in a crib to promote safe sleep. Advertisements for unsafe crib accessories can be so alluring for a new mother. Further outreach should be done to convey this message and the bumper pad message to other mothers that are exposed to the marketing of these items.

CHAPTER FIVE: CONCLUSION

This research project focused on identifying the mothers that attended Cribs for Kids classes in order to further develop the class to best fit the needs of this target population. This research project also served to identify what mothers are unaware of when it comes to recommendations for safe sleep. Referral forms were referenced for demographic information and quantitative pre and post tests that were administered before and after Cribs for Kids classes. Through the referral forms, the target population that the class served was determined as Hawaiians/Part Hawaiians, Other Pacific Islanders (Samoan, Saipan, Tongan, Guam), mothers who are single, and mothers with only a high school diploma. This is the population at most risk for SUIDs and more community outreach should be targeted towards these people.

The American Academy of Pediatrics (AAP) has recommended pacifier usage recently, yet it is apparent that mothers are unaware of this new finding. With this in mind, Healthy Mothers Healthy Babies and other health care providers should be more adamant about sharing this information with all mothers. This preventative measure could be the next step that needs to be taken to further decrease the prevalence of SUIDs in Hawaii and the United States.

Bumper pads and wedges/positioners are highly marketed and claim to ensure that infants will be safe when sleeping. This is a common misconception among a significant amount of mothers found through the data and emphasis should be placed on informing mothers of the facts regarding these potentially dangerous accessories. Mothers may have their infant's best interest in mind when purchasing these items, but they are only creating a hazardous environment for them. To progress and reduce infant deaths, this is

one unsafe sleep practice that needs to be better communicated to all mothers in Hawaii and throughout the United States.

Implications for Future Research

This study focused primarily on identifying the population that the Hawaii Cribs for Kids Program currently served and informed mothers about recommendations for safe sleep. Based on the data, future research should be done on topics relating to this one that would provide useful information.

On the referral form, mothers were asked about risk factors that may potentially lead to SUIDs such as initial and regular prenatal care, breastfeeding methods, maternal and family/household alcohol use, maternal and family/household illicit drug use, immunization. All of these factors should be further investigated in order to understand the target population more thoroughly in order to provide resources to promote healthy pregnancies.

Additionally, follow up calls at 3 and 9 to 12 months postpartum should be investigated to determine the efficacy of the Cribs for Kids classes after completion. This will provide information about whether or not the cribs are benefitting the mothers and if they are continuing to take recommendations into consideration when actually putting their children to sleep. By compiling this information, Healthy Mothers Healthy Babies can further improve their class to better serve the population at risk.

Lastly, there should be more research done on the misconceptions that mothers encounter when trying to purchase accessories for their infant's cribs. Since there were so many mothers that incorrectly answered questions regarding pacifier, wedge/positioner, and bumper pad usage, there are possibly lots of other mothers that are unintentionally

purchasing items that can be hazardous to their infants. Additionally, further education should be done regarding pacifier usage while sleeping. This new recommendation can potentially reduce many sleep related deaths, if implemented.

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Appendix A: Survey Instrument

Name _____ Date _____

Safe Sleep Test (Pre)

- 1) The safest position for my baby to sleep is on his stomach so he doesn't choke when he spits up.
 - a. True
 - b. False
- 2) The safest place for my baby to sleep is in a crib in my room.
 - a. True
 - b. False
- 3) It's best for my baby to have a soft mattress to sleep on at night.
 - a. True
 - b. False
- 4) If I don't have a mattress for my baby to sleep on, I should put him to sleep on a soft pillow in a crib.
 - a. True
 - b. False
- 5) I should give my baby a pacifier while he sleeps because it makes it easier for him to breathe.
 - a. True
 - b. False
- 6) It's safe to put my baby to sleep in a car safety seat, stroller, swing, infant carrier or infant sling for routine (every day) sleep.
 - a. True
 - b. False
- 7) I should always put my baby to sleep with a soft blanket to keep her warm.
 - a. True
 - b. False
- 8) If my baby feels hot to the touch or is sweating, she may be overheating.
 - a. True
 - b. False

- 9) To stop my baby from overheating, her clothes should be no more than one layer thicker than what an adult would wear to be comfortable in at that time.
- a. True
 - b. False
- 10) I should use bumper pads in my baby's crib so he doesn't get hurt.
- a. True
 - b. False
- 11) I should use a wedge or a positioner to protect my baby from Sudden Infant Death Syndrome/Sudden Unexplained Infant Death (SIDS/SUID).
- a. True
 - b. False
- 12) It's safe to sleep with my baby in an adult bed as long as I use a portable bed rail to prevent falls.
- a. True
 - b. False
- 13) I should let my baby play on her stomach while she is awake, but put her on her back in a crib if she goes to sleep.
- a. True
 - b. False
- 14) Feeding my baby breast milk instead of infant formula will help protect her from SIDS/SUID.
- a. True
 - b. False
- 15) It's safe to breastfeed my baby in bed as long as I put her back in the crib when it's time to go to sleep.
- a. True
 - b. False
- 16) It's safe to put two babies to sleep in the same crib as long as the crib is safety-approved.
- a. True
 - b. False
- 17) If I drink alcohol or use illicit drugs while I'm pregnant or after my baby is born, he is more likely to die of SIDS/SUID.

- a. True
- b. False

18) I should not smoke while I'm pregnant, but it is ok for me to smoke once my baby turns one month old.

- a. True
- b. False

19) Attending all of my prenatal care appointments can help keep my baby safe.

- a. True
- b. False

20) I should get my child immunized because it could protect him from SIDS/SUID.

- a. True
- b. False

Name_____ Date_____
Safe Sleep Test (Post)

1. The safest position for my baby to sleep is on his stomach so he doesn't choke when he spits up.
 - a. True
 - b. False
2. The safest place for my baby to sleep is in a crib in my room.
 - a. True
 - b. False
3. It's best for my baby to have a soft mattress to sleep on at night.
 - a. True
 - b. False
4. If I don't have a mattress for my baby to sleep on, I should put him to sleep on a soft pillow in a crib.
 - a. True
 - b. False
5. I should give my baby a pacifier while he sleeps because it makes it easier for him to breathe.
 - a. True
 - b. False
6. It's safe to put my baby to sleep in a car safety seat, stroller, swing, infant carrier or infant sling for routine (every day) sleep.
 - a. True
 - b. False
7. I should always put my baby to sleep with a soft blanket to keep her warm.
 - a. True
 - b. False
8. If my baby feels hot to the touch or is sweating, she may be overheating.
 - a. True
 - b. False
9. To stop my baby from overheating, her clothes should be no more than one layer thicker than what an adult would wear to be comfortable in at that time.
 - a. True
 - b. False
10. I should use bumper pads in my baby's crib so he doesn't get hurt.
 - a. True
 - b. False
11. I should use a wedge or a positioner to protect my baby from Sudden Infant Death Syndrome/Sudden Unexplained Infant Death (SIDS/SUID).

- a. True
 - b. False
12. It's safe to sleep with my baby in an adult bed as long as I use a portable bed rail to prevent falls.
- a. True
 - b. False
13. I should let my baby play on her stomach while she is awake, but put her on her back in a crib if she goes to sleep.
- a. True
 - b. False
14. Feeding my baby breast milk instead of infant formula will help protect her from SIDS/SUID.
- a. True
 - b. False
15. It's safe to breastfeed my baby in bed as long as I put her back in the crib when it's time to go to sleep.
- a. True
 - b. False
16. It's safe to put two babies to sleep in the same crib as long as the crib is safety-approved.
- a. True
 - b. False
17. If I drink alcohol or use illicit drugs while I'm pregnant or after my baby is born, he is more likely to die of SIDS/SUID.
- a. True
 - b. False
18. I should not smoke while I'm pregnant, but it is ok for me to smoke once my baby turns one month old.
- a. True
 - b. False
19. Attending all of my prenatal care appointments can help keep my baby safe.
- a. True
 - b. False
20. I should get my child immunized because it could protect him from SIDS/SUID.
- a. True
 - b. False

Appendix B: Referral Form



Safe Sleep Education Only _____
 Safe Sleep Education and Pack 'n Play _____
 Date of Education _____
 Date Pack 'n Play Given _____
 Date sent To Coordinator _____

HAWAII CRIBS FOR KIDS® REFERRAL FORM

Date of Referral: _____

Name of Mother/ Guardian: _____ DOB: _____

Name Mother Prefers To Be Called _____

Mother's Address _____

City State County Zip

Home Phone #: _____ Cell Phone #: _____

Marital Status: ___ Single ___ Unmarried/cohabiting ___ Married ___ Divorced
 ___ Other (Please Specify): _____

Mode of Transportation: ___ Drives ___ Family/friend drives ___ Public transportation

Education Level (Years of School Completed):

___ Some High School ___ 2-year Community College Graduate
 ___ High School Graduate ___ 4-year College Graduate
 ___ G.E.D. certificate ___ Completed Graduate School
 ___ Some college ___ Other (Please specify): _____

Race (Check all that apply):

___ Hawaiian ___ Japanese ___ Korean ___ Chinese
 ___ Laotian ___ Vietnamese ___ Filipino
 Black
 ___ White (non-Hispanic) ___ Hispanic or Latino ___ Alaska Native ___ Micronesian
 ___ Samoan ___ American Indian
 ___ Other (Please Specify): _____

Interpreter needed: ___ Yes ___ No

Can you read English? ___ Yes ___ No

Language Spoken:

___ Hawaiian ___ Japanese ___ Korean ___ Chinese
 ___ Laotian ___ Vietnamese ___ Tagalog ___ Ilokano
 ___ Samoan ___ Marshallese ___ Chuukese
 ___ Other (Please Specify): _____

Name of Interpreter (Please Print): _____

Signature of Interpreter: _____

Interpreter's Phone: _____

Health Insurance: Mother: ☐ Yes ☐ No Baby: ☐ Yes ☐ No

Name of Insurance if answered yes to above question:

Mother's Insurance: _____

Baby's Insurance: _____

Pediatrician or Group Name: _____

Physician Address _____

Has mother received regular prenatal care? ☐ Yes ☐ No

Timing of First Prenatal Visit: mother was approximately _____ weeks pregnant at time of prenatal visit

Type of pregnancy: ☐ Singleton ☐ Twins ☐ Other (Please specify): _____

First prenatal visit took place in mother's: ☐ First ☐ Second ☐ Third Trimester of pregnancy

Due Date: _____ **AND Date of Birth (if applicable):** _____ **Is this mom's first child?** ☐ Yes ☐ No

If Not, What are the ages of her other children? _____

Where do the other children sleep? _____

Baby's Name (If applicable): _____

Infant's Current or Planned Sleep Location (check all that apply):

☐ Adult Bed ☐ Infant Car seat ☐ Sofa ☐ Hospital Bassinet ☐ Floor

☐ Other (Please Specify): _____

Infant's Current or Planned Sleep Position (check all that apply):

☐ Belly ☐ Back ☐ Side ☐ No usual position/don't know

How is the mother planning to feed or is currently feeding her baby?

☐ Exclusive Breastfeeding at the breast ☐ Exclusive Breastmilk in a Bottle

☐ Both Breastmilk and Formula ☐ Exclusive Formula

Has anyone talked to the mother about the benefits of breastfeeding her baby?

☐ Yes ☐ No

Would she like more information about breastfeeding?

☐ Yes ☐ No

Is mother planning on giving her infant a pacifier?

☐ Yes ☐ No

If yes, when is she planning on introducing the pacifier to baby?

☐ Immediately after birth

☐ At about 2-3 weeks after birth

☐ At about 3-4 weeks after birth

☐ When the infant is older than 4 weeks

Environmental Smoke (check all that apply, and indicate if not applicable):

- ☐ Mother smoked during pregnancy
- ☐ Mother will smoke after pregnancy: *Identify Location(s)*: ☐ Inside ☐ Outside ☐ Car
- ☐ Members of the household smoke: *Identify Location(s)*: ☐ Inside ☐ Outside ☐ Car
- ☐ Members of the household will smoke after baby is born: *Identify Location(s)*: ☐ Inside ☐ Outside ☐ Car

Alcohol Use (check all that apply, and indicate if not applicable)

☐ Mother consumed/consumes alcohol during pregnancy (If yes, specify quantity and frequency of use):

- ☐ Approximate number of alcoholic drinks consumed during pregnancy
- ☐ Frequency of alcohol consumption during pregnancy
- ☐ 0-1 drinks per week
- ☐ 2-3 drinks per week
- ☐ more than 3 drinks per week
- ☐ Approximate number of alcoholic drinks consumed in one sitting
- ☐ 0-1
- ☐ 1-2
- ☐ more than 3 drinks

Comments: _____

- ☐ Mother does/will consume alcohol after baby is born
- ☐ Family members living in the same household as baby consume alcoholic beverages
- If yes, quantity and frequency of use
- ☐ Approximate number of alcoholic drinks consumed in one sitting
- ☐ 0-1
- ☐ 1-2
- ☐ more than 3 drinks
- ☐ Approximate number of alcoholic drinks consumed per week
- ☐ Approximate number of alcoholic drinks consumed per month

Illicit Drug Use (indicate if not applicable)

- ☐ Mother used/uses illicit during pregnancy
- If yes, quantity and frequency of use:
- ☐ Approximate number of times used during pregnancy
- ☐ Frequency of use during pregnancy
- ☐ 0-1 times per week
- ☐ 2-3 time per week
- ☐ More than 3 times per week

Comments: _____

___ Family members living in the same household as baby use illicit drugs

If yes, quantity and frequency of use

___ Approximate number time per week

___ Approximate number of alcoholic drinks consumed per month

___ Frequency of use

___ 0-1 times per week

___ 2-3 time per week

___ More than 3 times per week

Is the mother planning on getting her infant immunized?

___ Yes ___ No

If no, please explain _____

Childcare:

___ Home-based ___ Daycare ___ Relatives/Friends ___ None ___ Not sure yet

Annual Household Income: _____

.....

.....

Referring Agency: _____

Care Coordinator/Case Manager: _____

Agency Telephone Number: _____

Email: _____

HAWAII CRIBS FOR KIDS® AGREEMENT FOR REFERRAL

● I agree to allow (Referring Agency Name)_____to provide my referral information to the Cribs for Kids® Program to obtain a crib for my baby, I understand that the safest place for my baby to sleep is on their back in a “safety-approved crib, pack ‘n play, bassinette or cradle”.

I understand that this referral does not guarantee or imply that I am eligible to receive a Graco Pack ‘n Play® from the Cribs for Kids® Program and that it may take up to 7 days to process this application to determine eligibility. _____

Initial of Participant

● I agree that if I qualify to participate in the Cribs for Kids® Program, I **must** attend a one-hour safe sleep class in order to receive a free pack’n play. _____

Initial of Participant

● I agree that only **one** pack ‘n play will be given to my family through the Cribs for Kids® Program.

Initial of Participant

● I also agree not to contact other Cribs for Kids® partner agencies with the intent to obtain additional crib(s)

"pack ‘n plays" _____

Initial of Participant

● I agree to at least 2 follow up phone calls to occur when my baby is at least 3 months of age and the second

phone call will occur when my baby is at least 1 year of age. _____

Initial of Participant

Name of mother or guardian of baby (Please Print)

Signature of mother or guardian of baby

Please mail or email completed forms to:

**HMHB Hawaii
Cribs for Kids
310 Paoakalani Ave, #202A
Honolulu, HI 96815
Office: (808) 737-5805
Email: katelynm@hmhb-hawaii.org**